

Draft  
AVAQMD  
2004 Ozone Attainment Plan  
(State and Federal)

February 2004

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## **Abbreviations and Acronyms**

AQMA	Air Quality Management Area
AQMP	Air Quality Management Plan
AVAPCD	Antelope Valley Air Pollution Control District
AVAQMD	Antelope Valley Air Quality Management District
CAAQS	California Ambient Air Quality Standard
CARB	California Air Resources Board
CCAA	California Clean Air Act
CO	Carbon Monoxide
FCAA	Federal Clean Air Act
NAAQS	National Ambient Air Quality Standard
NO <sub>x</sub>	Oxides of Nitrogen
O <sub>3</sub>	Ozone
ROG	Reactive Organic Gases
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
UAM	Urban Airshed Model
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

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## **Executive Summary**

The United States Environmental Protection Agency (USEPA) designated the Southeast Desert Modified Air Quality Management Area (Southeast Desert Modified AQMA) as non-attainment for ozone National Ambient Air Quality Standards (NAAQS) pursuant to the provisions of the Federal Clean Air Act (FCAA). The Antelope Valley is included in the Southeast Desert Modified AQMA. The California Air Resources Board has also designated the Antelope Valley non-attainment for ozone California Ambient Air Quality Standards (CAAQS) pursuant to the provisions of the California Clean Air Act (CCAA). The South Coast Air Quality Management District (SCAQMD) adopted attainment plans for the Antelope Valley when the region was under its jurisdiction. The most recent such plan that was approved by USEPA is the 1994 version of the SCAQMD Air Quality Management Plan (AQMP).

The Antelope Valley Air Quality Management District now has jurisdiction over the Antelope Valley. The AVAQMD has reviewed and updated all elements of the ozone plan. The Antelope Valley will be in attainment of the NAAQS for ozone by the required year, 2007. The Antelope Valley will also show significant progress towards attainment of the CAAQS for ozone standard by that year.

This document includes the latest planning assumptions regarding population, vehicle activity and industrial activity. This document addresses all existing and forecast ozone precursor-producing activities within the Antelope Valley through the year 2007. This document includes all necessary information to allow general and transportation conformity findings to be made within the Antelope Valley.

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## **CHAPTER 1 - Introduction and Background**

Purpose

Regulatory History

Statement of Issues

Federal Legal Requirements

State Legal Requirements

Pollutant Descriptions

Health Effects

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# **INTRODUCTION**

## **Purpose**

The Southeast Desert Modified AQMA (as defined in 40 CFR 81.167) has been designated non-attainment for the NAAQS for ozone by USEPA (40 CFR 81.305) and the Antelope Valley has been designated non-attainment for the CAAQS for ozone by CARB (17 Cal. Code Reg. §60201). The Antelope Valley Air Quality Management District (AVAQMD) has experienced ambient ozone concentrations in excess of the one-hour ozone NAAQS and the ozone CAAQS. This document: (1) demonstrates that the AVAQMD will meet the primary required federal ozone planning milestones, attainment of the ozone NAAQS by the end of 2007; (2) presents the progress the AVAQMD will make towards meeting all required state ozone planning milestones, including attainment of the ozone CAAQS; and (3) discusses the 8 hour ozone NAAQS, preparatory to an expected non-attainment designation for the new NAAQS. This document satisfies 42 U.S.C. §§7410, 7502, 7504 and 7511a (FCAA §§110, 172, 174, and 182) regarding implementation plans, non-attainment plan provisions, planning procedures, and ozone plan submissions and requirements for the one-hour NAAQS. This document also satisfies or addresses Health & Safety Code (H&SC) §§40911, 40912, 40913, 40914, 40915, 40918, 40924, and 40925 regarding ozone attainment plans and plan elements.

## **BACKGROUND**

### **Regulatory History**

The USEPA classified the desert portion of Los Angeles County as Severe-17 for ozone as part of the Southeast Desert Modified AQMA. This large “maintenance area” was classified based on a 0.24 ppm ozone design value calculated from pre-1990 concentrations in Banning. The Severe-17 classification requires attainment of the one-hour ozone NAAQS by the end of 2007, 17 years after the adoption of the FCAA Amendments in 1990.

The desert portion of Los Angeles County was established as its own air district as of July 1, 1997, the Antelope Valley Air Pollution Control District (AVAPCD), pursuant to former H&SC §40106 (Statutes 1996 ch 542, Repealed Statutes 2001 ch. 163). This air district was replaced by the AVAQMD on January 1, 2002, pursuant to H&SC §41300 et seq (Statutes 2001 ch. 163). As a successor district to SCAQMD, the AVAQMD assumes the authorities and duties of the SCAQMD for the Antelope Valley (H&SC §41302).

The SCAQMD addressed the desert portion of Los Angeles County in the 1991 AQMP, the 1994 AQMP, and the 1997 AQMP. The 1994 AQMP is the most recent ozone attainment plan for the desert portion of Los Angeles County that has been approved by USEPA. The USEPA has approved a revision to the 1997 AQMP that was adopted after the formation of the AVAPCD. The AVAQMD will address that approved plan in this document, but this document replaces all previously submitted plans.

## **Regional Ozone Planning Chronology**

November, 1990 - Adoption of Federal Clean Air Act Amendments  
September 9, 1994 – SCAQMD adopts 1994 AQMP  
November 15, 1994 – SCAMQD submits 1994 AQMP to CARB  
July 10, 1996 – CARB submits 1994 to USEPA  
November 15, 1996 – SCAQMD adopts 1997 AQMP  
January 8, 1997 – USEPA approves 1994 AQMP into State Implementation Plan (63 FR 1150)  
February 5, 1997 – CARB submits 1997 AQMP to USEPA  
July 1, 1997 – AVAPCD is formed  
April 21, 1998 – USEPA approves CO portion of 1997 AQMP for SCAB (63 FR 19661)  
July 24, 1998 – USEPA approves NO<sub>2</sub> portion of 1997 AQMP for SCAB (63 FR 39747)  
January 12, 1999 – USEPA proposed limited approval/disapproval for remainder of 1997 AQMP, approving emission inventories but disapproving attainment demonstration, reasonable further progress, milestones and proposed control measures (64 FR 1770)  
December 10, 1999 – SCAQMD adopts update to 1997 AQMP that fixes problems identified in January 12, 1999 USEPA action  
February 4, 2000 – CARB submits revised 1997 AQMP to USEPA  
April 10, 2000 – USEPA approves 1997 AQMP  
January 1, 2002 – AVAPCD changed to AVAQMD

## **Statement of Issues**

The Antelope Valley is downwind of the Los Angeles basin, and to a lesser extent, is downwind of the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the Antelope Valley during the summer ozone season. These transport couplings have been officially recognized by CARB.<sup>1</sup> Local Antelope Valley emissions contribute to exceedances of both the NAAQS and CAAQS for ozone, but the Antelope Valley would be in attainment of both standards without the influence of this transported air pollution from upwind regions.

## **Federal Legal Requirements**

The AVAQMD must adopt a plan that provides for the implementation, maintenance and enforcement of the NAAQS within three years after promulgation of the NAAQS. The plan is to include enforceable emission limitations, provide for a monitoring program, provide for a permit program (including a new source review program), contingency measures, and air quality modeling (42 U.S.C. §7410(a); FCAA §110(a)). The SCAQMD met this requirement with their 1991 Air Quality Management Plan and its 1994 update. This document represents an update to the Antelope Valley portion of that plan. The AVAQMD has adopted enforceable emission limitations, has a monitoring program in place (at Lancaster), maintains a permit program (including a New Source Review program with an ambient air quality modeling requirement), and has performed an attainment demonstration using air quality modeling. This document does

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<sup>1</sup> “Ozone Transport: 2001 Review,” April 2001, CARB identifies the South Coast Air Basin as having an overwhelming and significant impact on the Mojave Desert Air Basin (which includes the Antelope Valley) and the San Joaquin Valley as having an overwhelming impact on the MDAB.

not include any contingency measures, as any such contingent reductions must occur in the upwind areas that are responsible for the Antelope Valley's ozone NAAQS exceedances.

This document incorporates all reasonably available control measures (all such measures have already been adopted for the Antelope Valley). This document includes a comprehensive, accurate and current inventory of actual emissions (42 U.S.C. §7502(c)(3), 7511a(a)(1); FCAA §§172(c)(3), 182(a)(1)).

This document discusses reasonable further progress (42 U.S.C. §§7502(c)(2), 7511a(b)(1); FCAA §§172(c)(2), 182(b)(1)) for the applicable periodic milestone dates (2002, 2005 and 2007) (42 U.S.C. §7511a(g); FCAA §182(g)). The Antelope Valley is not capable of meeting the reasonable further progress milestones on its own; the target levels would require reductions in source categories that are not under the jurisdiction of the AVAQMD (specifically mobile sources).

This document has been coordinated with the transportation planning process (42 U.S.C. §7504; FCAA §174). The document includes an on-road mobile source emission budget for the Antelope Valley, and also includes the on-road mobile source emission budget for the entire Southeast Desert Modified AQMA as an appendix.

This document updates the Antelope Valley emissions inventory (42 U.S.C. 7511a(a)(1); FCAA §182(a)(1)). The SCAQMD met the original inventory requirement with their 1991 Air Quality Management Plan and subsequent updates.

The AVAQMD has an enhanced non-attainment pollutant monitoring program, requires reasonably available control technology, has an enhanced vehicle inspection and maintenance program, a De Minimis rule, and a gasoline vapor recovery rule. The District participates in the state's Clean-Fuel Vehicle Program, and performs periodic transportation activity consistency demonstrations in conjunction with the Southern California Association of Governments (including a review of vehicle miles traveled growth). The AVAQMD controls oxides of nitrogen (NO<sub>x</sub>) in addition to Volatile Organic Compounds (VOC), and is addressing both pollutants in this document. The AVAQMD new source review program defines sources emitting 25 tons per year or more as major and requires offsets at a 1.3 to 1 ratio (42 U.S.C. §§7511a(d), 7511a(d)(2); FCAA §§182(d) 182(d)(2)). Employer trip rules (42 U.S.C. §7511a(d)(1); FCAA §182(d)(1)) have been shown to be not cost-effective for the AVAQMD due to low population density.

## **State Legal Requirements**

H&SC §40911 requires each district that is a receptor of transported air pollutants to prepare and submit a plan to CARB not later than June 30, 1991. SCAQMD met this requirement for the Antelope Valley with their 1991 Air Quality Management Plan submission. This document is a revision to that plan and its subsequent revisions.

H&SC §40912 requires a downwind district plan to contain sufficient measures to reduce emissions originating in the district below the level at which violations of the CAAQS would

occur in the absence of transported contribution. This document addresses this requirement to the extent possible.

This document achieves and maintains the CAAQS by the earliest possible date considering concentrations, violations, transport, emission projections, emission inventories, control measures, emission reductions, military base closures, and cost effectiveness (H&SC §40913).

H&SC §40914 requires specific annual ozone precursor emission reductions relative to 1990 (five percent per year or as otherwise approved), and the adoption of all feasible measures. This document addresses this requirement, but it is not feasible to achieve the reduction specified without reducing sources not under the jurisdiction of the AVAQMD. The AVAQMD has adopted and will adopt all feasible control measures.

H&SC §40915 requires that the plan include contingency measures for use in case of inadequate progress towards attainment. The AVAQMD has adopted all feasible measures; any contingent reductions must be obtained either upwind or from sources not under the AVAQMD's control (mobile sources).

The AVAQMD has a New Source Review program, has implemented Reasonably Available Control Technology on all sources, has an emissions inventory system, and has a public education program (H&SC §40918). Reasonably available transportation control measures, area-wide and indirect source control programs have been shown not to be cost-effective within the AVAQMD due to insufficient population density.

This document includes the required assessment of progress towards attainment of the CAAQS, addressing concentrations, emissions and control measures (H&SC §40924). This document updates previously submitted plans and summaries of progress.

This document corrects deficiencies, updates planning assumptions and addresses emissions reductions and growth since previous plan submissions (H&SC §40925). This document updates previous plan submissions by SCAQMD.

## **Pollutant Description and Health Effects**

Ozone (O<sub>3</sub>)- A colorless gas that is a highly reactive form of oxygen. It has a strong odor when highly concentrated. Ozone can occur naturally but can also be formed from other compounds through photochemistry, a complex system of reactions with hydrocarbons and oxides of nitrogen in the presence of sunlight (ultraviolet). The Antelope Valley experiences ozone concentrations in excess of the state and federal ambient air quality standards.

Ozone can cause respiratory irritation and discomfort, making breathing more difficult during exercise. Ozone can reduce the respiratory system's ability to remove inhaled particles, increase pulse rate, decrease blood pressure and reduce the body's ability to fight infection. After six hours of exposure a healthy person can have significant reduction of lung function. It is an irritant towards the skin, eyes, upper respiratory system, and mucous membranes, although symptoms disappear after exposure. It may also be a carcinogen.

## **Setting**

The Antelope Valley is the desert portion of Los Angeles County. This region has been designated non-attainment for the one-hour ozone NAAQS by USEPA as a portion of the Southeast Desert Modified AQMA, based on a 240 part per billion (ppb) ozone design value monitored at Banning, California in Riverside County (40 CFR 81.305). The Southeast Desert Modified AQMA was defined using the Los Angeles-Anaheim-Riverside Consolidated Metropolitan Statistical Area, and includes a portion of the counties of Riverside and San Bernardino (40 CFR 81.167). The 240 ppb ozone design value classifies the area as a Severe-17 non-attainment area with 2007 as the required attainment year (42 U.S.C. 7511(a)(2); FCAA §181(a)(2)). The Antelope Valley's classification within the State system is less clear. This document has been prepared with the assumption that the region should be classified as moderate ozone non-attainment within the State of California's classification system.

The Antelope Valley covers 1300 square miles and included 219,628 persons as of the 1990 census (approximately 400,000 in 2002), centered within the cities of Lancaster and Palmdale. The region is characterized by a wide, arid valley little precipitation. Air Force Plant 42 and a portion of Edwards Air Force Base are located in the area.

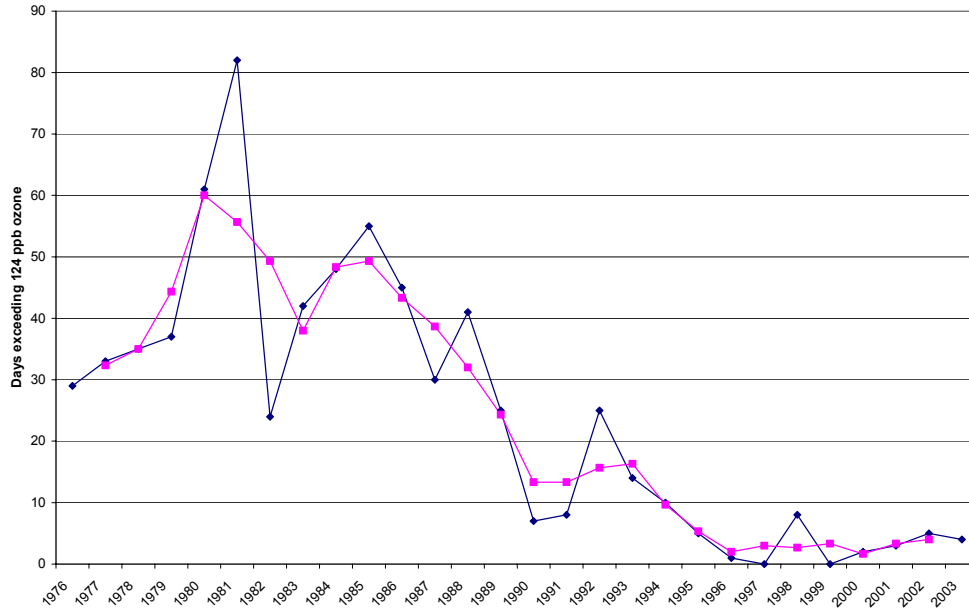
The primary roadways in the Antelope Valley are State Route 14 and State Route 18. Both of these arterials carry a substantial amount of daily commute traffic from the region into the Greater Los Angeles Basin.

The Antelope Valley is primarily a bedroom community, but does have significant aerospace development and manufacturing on Plant 42 (Boeing, Lockheed Martin and Northrop Grumman all lease facilities on the base from the Air Force).

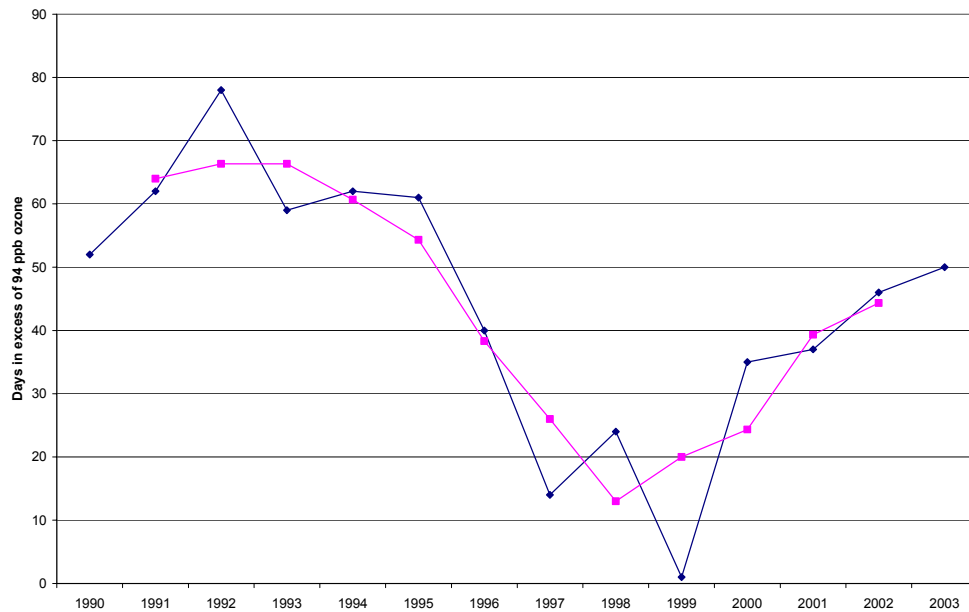
## **Ozone Trend**

The Antelope Valley has experienced a substantial reduction in the number of days when ozone exceeds the one-hour ozone NAAQS, as displayed in Figure 1 (the superimposed line is the three-year average trend line). The region has also experienced improvement in the number of days when ozone exceeds the ozone CAAQS, as shown in Figure 2 (the superimposed line is the three-year average trend). Note the significant change from 1998 to 1999 - 1998 was a hot year, and 1999 a cool year.

**Figure 1 - Federal One-Hour Ozone Exceedance Day Trend**



**Figure 2 - State Ozone Exceedance Day Trend**

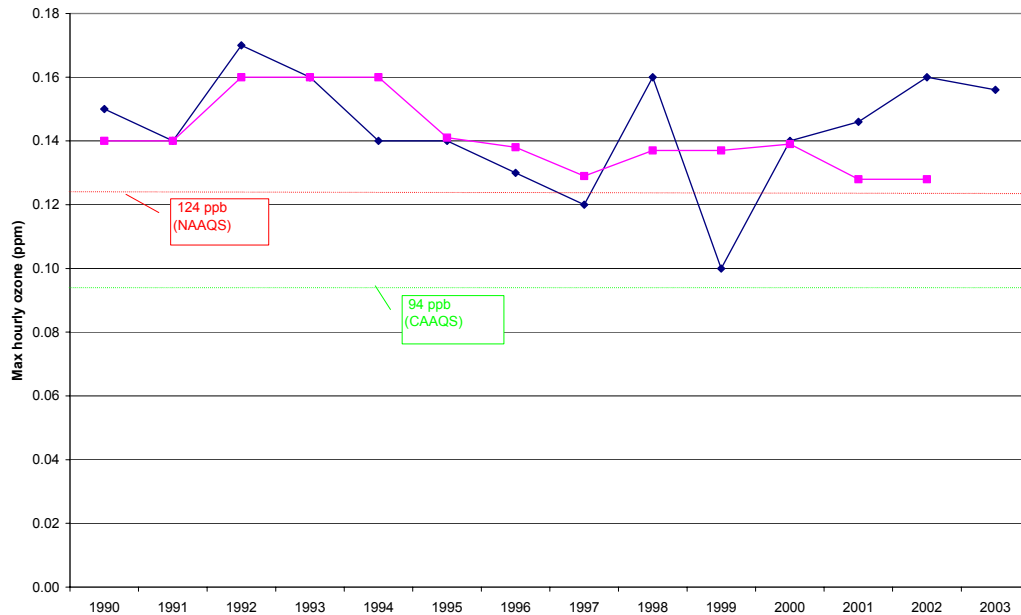


The Antelope Valley has experienced a small improvement in its maximum ozone concentration, particularly when calculated on a NAAQS/CAAQS basis (taking the fourth highest from each three years) - see Figure 3. The superimposed line is the fourth highest of three years trend.



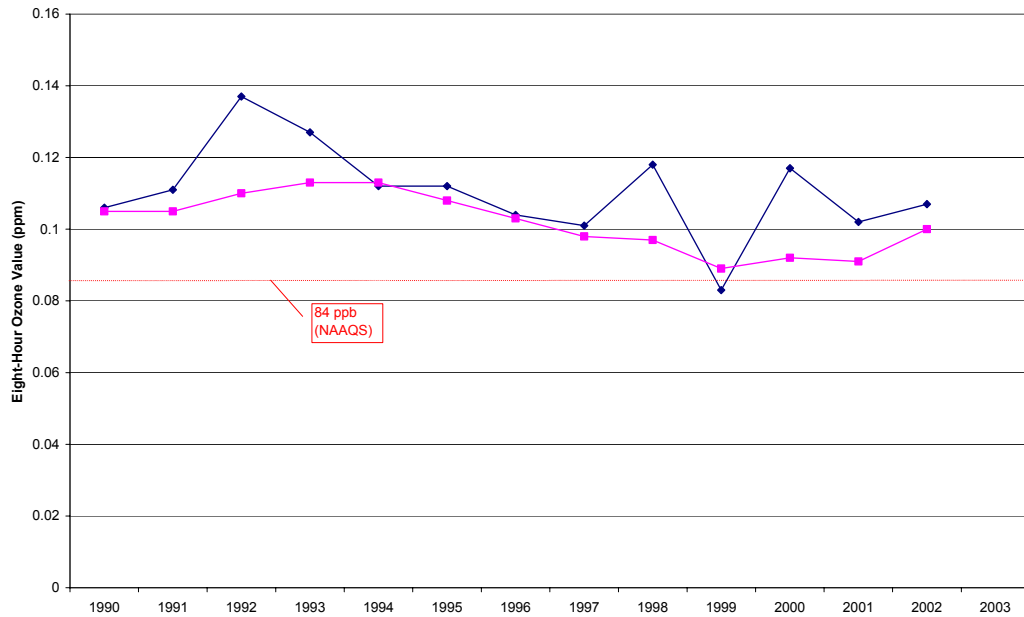
Figure 3 also includes lines representing the NAAQS level and the CAAQS level. As is shown in the figure, the AVAQMD is approaching attainment of the one-hour NAAQS.

**Figure 3 - Maximum One-Hour Ozone Concentration Trend**



No designations have yet been made for the recently promulgated eight-hour ozone NAAQS. The AVAQMD expects to be designated non-attainment for this standard based on ambient concentrations, presented in Figure 4. Progress towards attainment of the one-hour ozone standards also represents progress towards attainment of the eight-hour standard.

**Figure 4 - Maximum Eight-Hour Ozone Concentration Trend**



## **CHAPTER 2 – Emission Inventories**

Modeled Emission Inventory

Base Year

Future Years

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## Modeled Emission Inventory

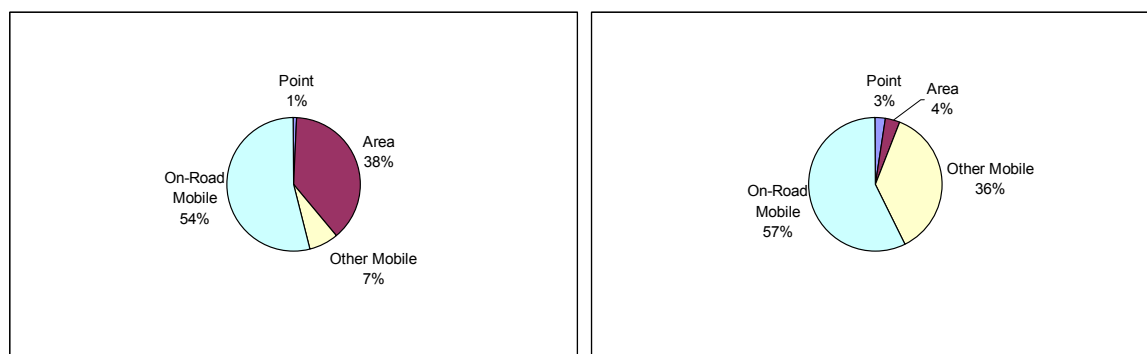
Complete documentation of the emission inventory used in the modeled attainment demonstration, and the planning inventory for all milestone years, is available at the following web address (contact martin Johnson at [mjohnson@arb.ca.gov](mailto:mjohnson@arb.ca.gov) or (916) 323-3567 if you have questions pertaining to this website):

<http://www.arb.ca.gov/app/emsinv/scos/index.php>

## Base Year Emission Inventory

The initial federal base year emission inventory was 1990. USEPA has since required that 2002 be used as the base year. 1990 is still used for reasonable further progress requirements. This document includes an updated 1990 inventory and a 2002 inventory. 2002 is used as the base year inventory for all growth scenarios in this document. The base year emission inventory is presented in Appendix A. Figure 5 presents the current 1990 base year VOC and NO<sub>x</sub> inventory in basic pie chart format (VOC on the left, NO<sub>x</sub> on the right). On-road mobile sources were the primary emitters in the Antelope Valley in 1990.

**Figure 5 - 1990 Base Year Pie Charts**



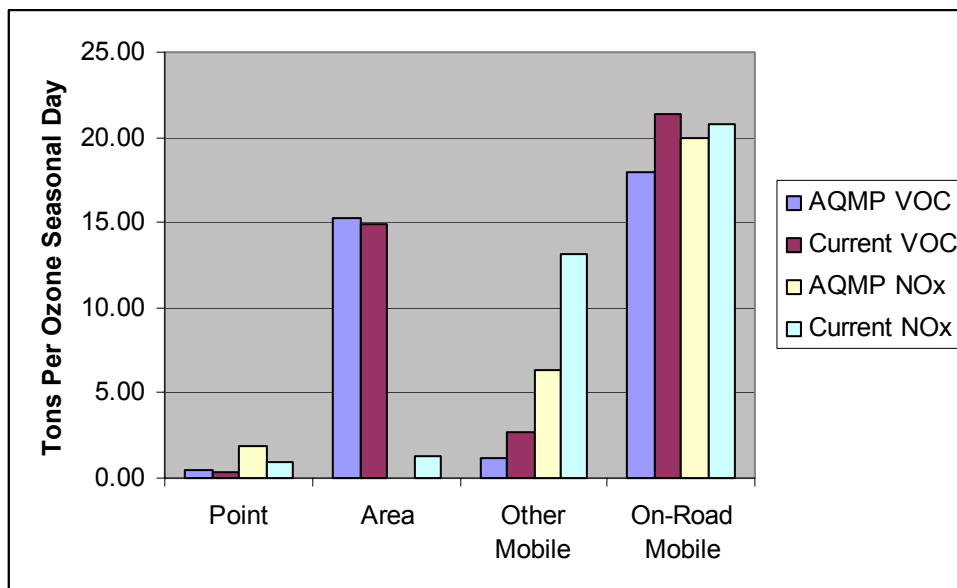
The primary revision to the 1990 base year involves changes to the on-road mobile source emissions inventory - this document includes on-road mobile source emissions calculated using EMFAC2002 version 2.2 with April 2003 activity and other SCAG inputs.<sup>2</sup> This represents the latest planning assumptions available to the AVAQMD.

Figure 6 compares the 1990 base year as presented in the 1994 AQMP with the current version. Point source data has been improved, reducing the 1990 contribution. Area source and mobile source emissions calculations have been substantially changed and improved, resulting in significant increase for area NO<sub>x</sub> and all mobile source emissions. In addition, the base year inventories in the 1994 AQMP did not adequately reflect aircraft emissions within the Antelope

<sup>2</sup> "Request #441 - Southeast Desert Modified AQMA Ozone SIP Motor Vehicle Inventory," CARB November 5, 2003

Valley - this document addresses aircraft emissions, including military, commercial and general aviation.

**Figure 6 - Comparison of AQMP 1990 with Current 1990**

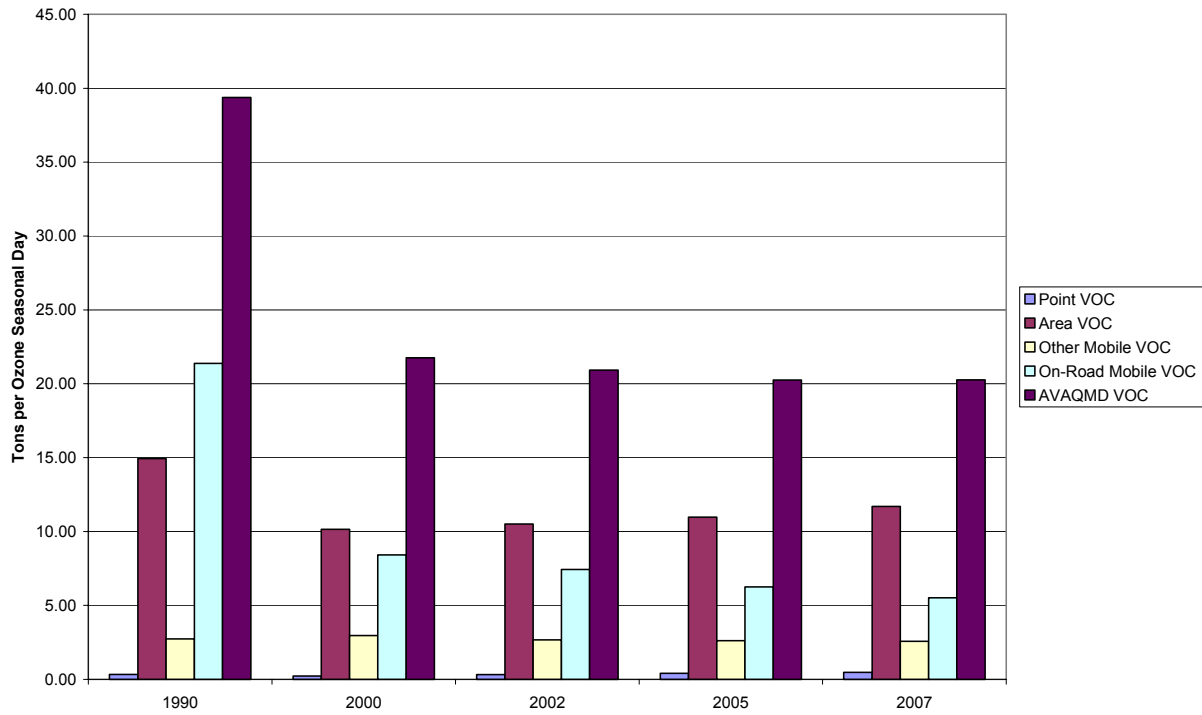


### **Future Year Emission Inventories**

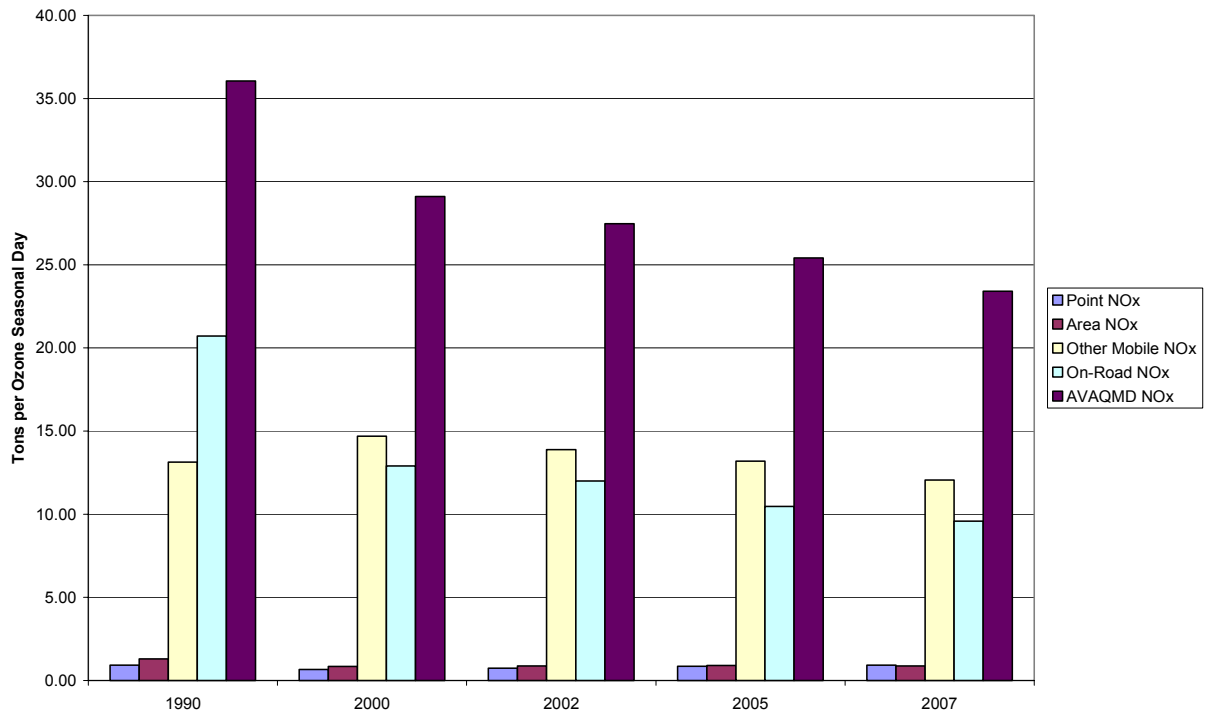
Future year or forecasted emission inventories are estimated by multiplying a base year value for each category by a 'growth code' for a given future year. The 'growth code' is indexed to the base year (2002 for this document), so that its value for the base year is 1.00. This allows the growth code to estimate future activity in terms of emissions; if the growth code for the year 2007 is 1.50, activity in that category (and resulting emissions) is expected to be 50 percent greater than in 2002. The AVAQMD uses the growth codes approved by CARB for such purposes. The growth codes used to forecast point sources are presented in Appendix B. Future year emission inventories are presented for 2005 and 2007 in Appendix B.

In addition to grown emissions, the future year inventories include the AVAQMD Emission Reduction Credit (ERC) bank as emissions. This is because ERCs could be converted into additional (new) emissions at any time. The future year inventories also include a New Source Review (NSR) growth allowance, to specifically account for emissions growth that is below the offset threshold of 25 tons. This NSR growth allowance is equivalent to adding 10 additional tons per year of growth (for both NO<sub>x</sub> and VOC) each year.

**Figure 7 - Forecasted VOC Emission Inventories**



**Figure 8 - Forecasted NO<sub>x</sub> Emission Inventories**



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## **CHAPTER 3 – Control and Contingency Measures**

Existing Control Measures

Proposed Control Measures

Rule Adoption Schedule

Contingency Measures

Required Progress

Controlled Emission Inventories

Conformity Budgets

Air Force Plant 42 Emissions Budget

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## **Existing Control Measures**

The complete SCAQMD set of rules and regulations as of July 1, 1997 remained in effect pursuant to statute within the Antelope Valley upon formation of the AVAPCD until the AVAPCD Governing Board amended or repealed the rules (former H&SC §40106). Between July 1, 1997 and January 1, 2002 the Governing Board of the AVAPCD amended and rescinded some of these rules on a rule-by-rule basis. These amendments and recessions were primarily housekeeping matters removing references and rules for which no sources existed as well as removing certain rules for which the AVAPCD had no underlying statutory authority. On January 1, 2002 the AVAPCD rules as of that date became the AVAQMD rules (H&SC §413020). The current AVAQMD rulebook, especially the prohibitory rules, remains the same as the SCAQMD rules as of July 1, 1997. This set of rules and regulations represented the best available and most restrictive set of stationary source control measures available. The SCAQMD 1994 AQMP did not contain any additional or proposed control measures for the Antelope Valley. The AVAQMD has in place Reasonably Available Control Technology requirements for all applicable sources (including gasoline dispensing vapor control), as well as a New Source Review program with a 25 ton per year major source level and a 1.3:1 offset ratio requirement.

## **Proposed Control Measures**

The AVAQMD is not proposing to adopt any additional control measures. The Antelope Valley has in place all applicable RACT rules, and is achieving the CAAQS and NAAQS by the earliest practicable date not as a result of local reductions, but as a result of reductions occurring upwind. The Antelope Valley will experience additional future emission reductions resulting from existing and proposed federal and state control measures affecting mobile and area sources.

## **Rule Adoption Schedule**

The AVAQMD is not proposing the adoption of any new control measures affecting ozone precursor emissions, so a rule adoption schedule is not presented here.

## **Contingency Measures**

Failure to attain or make appropriate progress in attaining any ozone standard would not be due to local emissions, but would be due to insufficient ozone precursor reductions in the upwind regions (primarily the SCAQMD). The AVAQMD therefore does not propose any contingency measures for local application.

## **Required Progress**

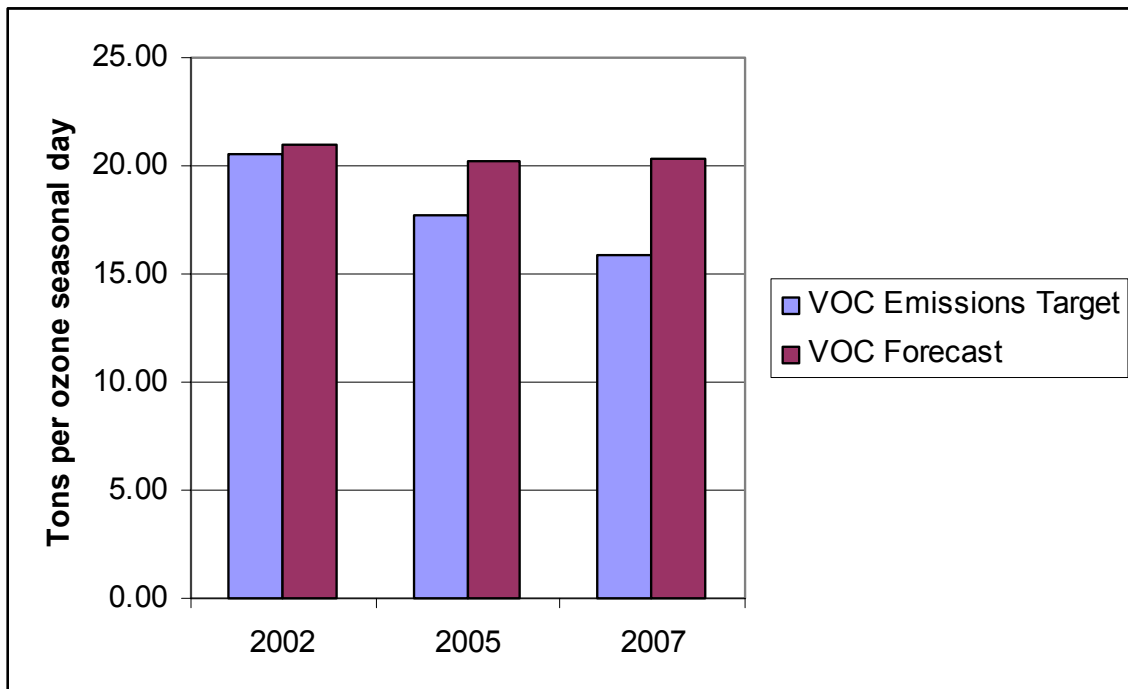
Both State and Federal law specify that the Antelope Valley must demonstrate ongoing emission reductions relative to the base year. Federal law requires a three percent (3%) per year reduction in ozone precursors, and does not allow credit to be taken for certain federal programs. Table 1 presents the base year emissions, the Federal Motor Vehicle Control Program (FMVCP) adjustment and adjusted base year (this adjustment changes based on the effectiveness of the federal program), the reasonable further progress required reduction percentage, the calculated emissions target (by year), and the actual emissions forecast.

**Table 1 - Federal Reasonable Further Progress**

	1990	2002	2005	2007
VOC	39.38	39.38	39.38	39.38
FMVCP Adjustment		-8.76	-9.01	-9.33
Adjusted VOC Baseline		30.62	30.37	30.05
ROP Reduction Target		0.33	0.42	0.48
Emissions Target		20.51	17.76	15.92
Forecast		20.86	20.25	20.27

Figure 9 illustrates that the Antelope Valley will not meet the required federal reasonable further progress target levels. The shortfall reaches four tons per day by 2007. Note that this shortfall does not represent an inability to meet the NAAQS, as the AVAQMD is demonstrating attainment by 2007 with urban airshed modeling. This shortfall does represent the Antelope Valley's dependence on upwind reductions for attainment purposes (or independence of local reductions for attainment purposes).

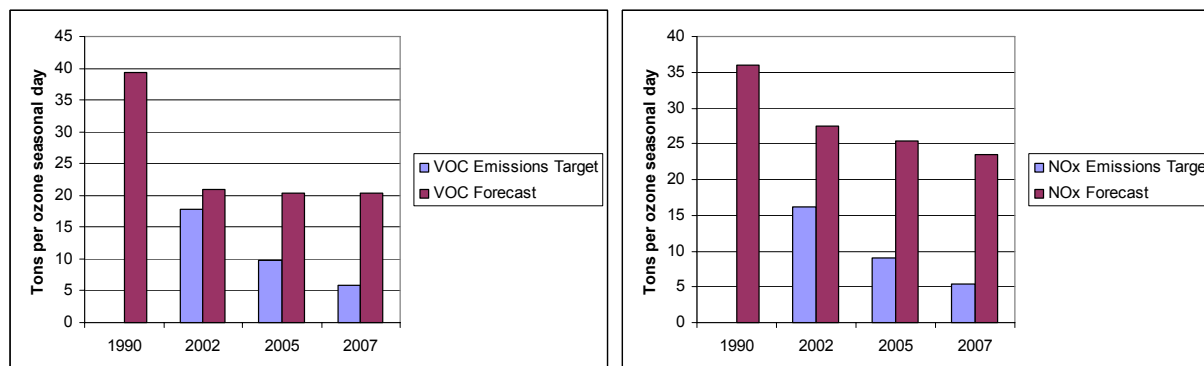
**Figure 9 - Federal Emissions Targets and Forecasts**



State law requires a five percent per year reduction in ozone precursors, relative to 1990. This equates to a substantial eighty five percent (85%) reduction requirement by 2007. As is shown in Figure 10, the Antelope Valley is not meeting this requirement, although significant reductions have been realized relative to 1990 levels. Meeting these reduction targets would require complete shutdown of all sources under the AVAQMD jurisdiction, and substantial

reductions from mobile sources and other sources not under the AVAQMD's jurisdiction, which is not feasible.

**Figure 10 - State Emissions Targets and Forecasts**



### Controlled Emission Inventories

As the AVAQMD is not proposing any additional control measures, the controlled emission inventory is identical to the forecasted emission inventory.

### Conformity Budgets

The forecasted emission inventories presented in this document are the emission budgets for general conformity purposes, as no additional control measures are proposed. A project subject to the general conformity test must be demonstrated to conform with the applicable portion of the forecasted emission inventory. For a project that falls between forecasted years, a linearly-interpolated inventory may be calculated. For a project that falls after 2007, use 2007.

The forecasted on-road mobile source inventory represents the emission budget for transportation conformity purposes, as no transportation control measures are proposed. A project subject to the transportation conformity test must be demonstrated to conform with the forecasted on-road mobile source inventory. The Antelope Valley on-road mobile source inventory is presented below, in addition to the appendices. The portion presented here is for information only - the AVAQMD is officially adopting the transportation budget for the entire Southeast Desert Modified AQMA as presented in Appendix C.

**Table 2 - Transportation Conformity Budget (Antelope Valley Portion)**

	1990	2000	2002	2005	2007
<i>(tons per ozone seasonal day)</i>					
On-Road Mobile Source VOC	21.38	8.42	7.44	6.26	5.52
On-Road Mobile Source NOx	20.72	12.90	11.99	10.47	9.58

## Air Force Plant 42 Emissions Budget

This document includes emissions from Air Force Plant 42 in the Antelope Valley emissions inventory. Air Force Plant 42 has military and commercial aircraft operations, and private aerospace development/manufacturing activity on leased property. Private activity is accounted for as an element of the point source emissions inventory. Aircraft emissions (and aircraft support equipment) are accounted for as an element of the other mobile source emissions inventory. For emissions budget purposes, the non-private Air Force Plant 42 emissions budget is presented in Table 3 (including military aircraft, commercial aircraft and aircraft ground support equipment).

**Table 3 - Air Force Plant 42 Emissions Budget**

	2002	2005	2007	2010	2020
(Tons per ozone seasonal day)					
CO	1.45	1.62	1.73	1.89	2.68
NOx	0.67	0.74	0.80	0.88	1.24
PM10	0.17	0.18	0.20	0.22	0.31
SOx	0.03	0.03	0.04	0.04	0.06
VOC	0.66	0.74	0.80	0.88	1.24
(tons per year)					
CO	529	591	631	690	978
NOx	245	270	292	321	453
PM10	62	66	73	80	113
SOx	11	11	15	15	22
VOC	241	270	292	321	453

## **CHAPTER 4 – Attainment Demonstration**

Modeling Approach Overview

UAM Overview

Modeling Domain

Model Inputs

Modeling Episodes

Modeling Results

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## **ATTAINMENT DEMONSTRATION**

This chapter paraphrases and reiterates information from the most recent SCAQMD/CARB ozone model runs, the runs performed for the 2003 SCAQMD AQMP. For further information, please refer to Appendix V of that document.<sup>3</sup>

### **Modeling Approach Overview**

The Antelope Valley is a small portion of the complex greater Southern California airshed. The Antelope Valley is also only one section of the larger federal ozone non-attainment area. Ozone and ozone precursors are known to flow (or be transported), under the influence of winds, throughout Southern California. The most technically accurate method of evaluating ozone concentrations, ozone emissions, and future ozone behavior is through a large modeling project that includes all of the affected areas in Southern California (and a portion of northern Mexico). The modeling effort has been performed as a joint project by all of the air districts in the region and CARB, with SCAQMD and CARB staff and resources doing the primary work. This regional modeling effort has allowed the most accurate understanding and prediction of future ozone concentrations for Southern California.

### **UAM Overview**

The UAM is the regional modeling system preferred by USEPA and CARB for analyzing ozone non-attainment areas. The UAM predicts future ambient ozone concentrations under historical conditions that led to high ambient ozone concentrations. These conditions are typically multi-day ‘episodes’ in which the state and federal ozone standards were exceeded. The UAM also evaluates ozone precursor emissions, local and regional meteorology, and regional topography to calculate ozone concentrations. These calculations are performed on an hourly basis throughout the modeled episode, thus allowing the UAM to simulate changing conditions (i.e. night, day and wind).

Future years are simulated twice using the UAM: first, using the uncontrolled emissions inventory; and second, using a reduced emissions inventory controlled by the proposed ozone control strategy. Comparing the uncontrolled and controlled ambient ozone concentrations identifies the effectiveness of the proposed ozone control strategy. Attainment year ambient ozone concentrations using the reduced emissions inventory controlled by the proposed ozone control strategy should achieve the state and federal ozone standards.

### **Modeling Domain**

The UAM performed by SCAQMD included the AVAQMD within its model domain. This model domain includes the upwind sources within SCAQMD, which are responsible for the overwhelming ozone transport into the AVAQMD.

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<sup>3</sup> “Final 2003 Appendix V - Modeling and Attainment Demonstrations,” SCAQMD, August 2003

## Model Inputs

SCAQMD performed the UAM attainment demonstration using data maintained by CARB and AVAQMD. The emissions inventory used for the UAM is consistent with the missions inventory presented in the appendices to this document.

## Modeling Episodes

Table 4 presents the two modeling results for the Antelope Valley.

**Table 4 - 2007 Federal Ozone Attainment Demonstration**

<b>Episode Day</b>	All concentrations are in parts per billion	
	<b>SCAB Max 2007 Ozone</b>	<b>Antelope Valley Max 2007 Ozone</b>
August 27, 1987	115	99
August 28, 1987	138	105
August 5, 1997	145	92
August 6, 1997	151	141 (99)*

The August 6, 1997 ozone concentration in the parentheses is the scaled (corrected) value to adjust for the systematic over-prediction in the base year.

## Model Results

The modeling results show that the Antelope Valley will attain the one-hour ozone NAAQS (124 ppb) in 2007, and will achieve progress in attaining the ozone CAAQS (94 ppb) by that year.

## **Appendices**

A - Base Year Emission Inventory

B - Future Year Emission Inventories and Point Source Growth Codes

C - Southeast Desert Modified AQMA Transportation Conformity Budget

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## APPENDIX A - BASE YEAR EMISSION INVENTORY

*All emissions are presented in tons per ozone seasonal day for the 2002 base year except where noted*

<b>Source</b>	<b>VOC</b>	<b>NO<sub>x</sub></b>
<i>Area Sources</i>		
Internal Combustion Engines - Unspecified Fuel	0.02	0.02
Internal Combustion Engines - Natural Gas	0.00	0.02
Internal Combustion Engines - Diesel	0.01	0.15
Manuf and Industrial Combustion - Natural Gas	0.00	0.06
Manuf and Industrial Combustion - Propane	0.00	0.03
Manuf and Industrial Combustion - Diesel	0.00	0.03
Manuf and Industrial Combustion - Unspecified	0.00	0.03
Service and Comm Space Heating - Natural Gas	0.00	0.02
Service and Comm Water Heating - Natural Gas	0.00	0.01
Service and Comm Combustion - Natural Gas	0.05	0.25
Residential Space Heating - Natural Gas	0.00	0.07
Residential Water Heating - Natural Gas	0.00	0.04
Residential Cooking - Natural Gas	0.00	0.04
Residential Combustion - Natural Gas	0.00	0.07
Residential Combustion - Propane	0.00	0.01
Residential Combustion - Wood Stoves	0.02	0.00
Landfill Gas	0.03	0.00
Cleaning and Degreasing	4.18	0.00
Natural Gas Transmission Loss	0.08	0.00
Petroleum Dispensing	0.52	0.00
Surface Blasting	0.02	0.00
Consumer Products	2.57	0.00
Architectural Coatings	1.23	0.00
Pesticides/Fertilizers	0.14	0.00
Asphalt Paving and Roofing	0.02	0.00
Livestock Waste	1.21	0.00
Commercial Charbroiling	0.03	0.00
Unspecified Cooking	0.01	0.00
<i>Total Area Sources:</i>	<i>10.15</i>	<i>0.85</i>
<i>Other Mobile Sources</i>		
General Aviation Civil Aircraft	0.12	0.00
Jet Aircraft - Military	0.59	0.58
Jet Aircraft - Commercial	0.07	0.09
Locomotives	0.15	3.16
Off-Road Recreational Vehicles	0.23	0.04
Lawn and Garden Equipment	0.36	0.06
Truck Refrigeration Units	0.01	0.03

<b>Source</b>	<b>VOC</b>	<b>NO<sub>x</sub></b>
Mobile Equipment - Commercial	0.19	0.32
Mobile Equipment - Industrial	0.05	0.36
Mobile Equipment - Construction	0.79	10.01
Mobile Equipment - Agricultural	0.01	0.05
Gasoline Can Storage and Handling	0.39	0.00
<i>Total Other Mobile Sources:</i>	<i>2.96</i>	<i>14.70</i>
 <i>On-Road Mobile Sources</i>	 <i>7.44</i>	 <i>11.99</i>
 <i>Point Sources (all emissions in tons per year)</i>		
Boeing NASA (Aerospace)	2.6	0.6
Lockheed Martin (Aerospace)	22.9	10.1
Northrop Grumman (Aerospace)	12.7	82
Antelope Valley Aggregate (Batch Plant)	3.7	46.0
Asphalt Construction Co (Batch Plant)	0.8	1.5
Calmat Vulcan 6851 Ave T (Batch Plant)	4.5	52.0
Calmat Vulcan 7107 Ave T (Batch Plant)	0.9	1.9
Granite Construction (Batch Plant)	0.0	0.1
Hi-Grade Materials Ave T (Batch Plant)	0.1	0.0
Rexhall Industries (Fiberglass)	20.0	0.0
Antelope Valley Healthcare System (Institution)	3.5	3.4
Ca State Prison - Los Angeles County (Institution)	0.4	0.2
LA County Sheriff W 60 <sup>th</sup> (Institution)	0.2	2.6
Magna Color (Misc Coating/Manuf)	0.7	0.0
Mountain High Combined (Misc Diesel Use)	9.6	48.0
Verizon (Misc Diesel Use)	0.0	0.6
LA County Palmdale Water Reclamation Plant	0.6	1.2
LA County Sanitation District #14	3.5	1.0
Lancaster Landfill, Waste Management	0.5	0.1
<i>Total Point Sources (tons per year):</i>	<i>87.2</i>	<i>251.3</i>
<i>Total Point Sources (tons per day):</i>	<i>0.24</i>	<i>0.69</i>
 <i>Total Antelope Valley (tons per os day):</i>	 <i>20.93</i>	 <i>27.48</i>

## APPENDIX B - FUTURE YEAR EMISSION INVENTORIES AND POINT SOURCE GROWTH CODES

	1990	2000	2002	2005	2007
Point VOC	0.34	0.23	0.24	0.41	0.47
Area VOC	14.93	10.15	10.51	10.97	11.70
Other Mobile VOC	2.73	2.96	2.67	2.61	2.58
On-Road Mobile VOC	21.38	8.42	7.44	6.26	5.52
AVAQMD VOC	39.38	21.76	20.86	20.25	20.27

	1990	2000	2002	2005	2007
Point NOx	0.92	0.66	0.69	0.85	0.91
Area NOx	1.29	0.85	0.87	0.90	0.87
Other Mobile NOx	13.13	14.70	13.88	13.19	12.05
On-Road NOx	20.72	12.90	11.99	10.47	9.58
AVAQMD NOx	36.06	29.11	27.43	25.41	23.41

Point Category	1990		2000		Base Year 2002		2005		2007	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Aerospace	82.4	200.0	37.2	90.2	38.2	92.7	40.1	97.3	39.1	94.9
Batch Plants	9.0	91.8	9.5	96.6	10.0	101.5	10.2	103.9	10.6	107.2
Fiberglass	16.1	0.0	18.2	0.0	20.0	0.0	22.7	0.0	24.3	0.0
Institution	3.4	5.1	4.0	6.0	4.1	6.2	4.2	6.4	4.4	6.6
Misc Coating/Manuf	0.6	0.0	0.6	0.0	0.7	0.0	0.8	0.0	0.9	0.0
Misc Diesel Use	7.1	36.1	8.9	45.1	9.6	48.6	10.6	53.6	10.9	55.4
Wastewater/Landfill	4.2	2.1	4.4	2.2	4.6	2.3	4.9	2.4	5.1	2.5
ERCs	0.0	0.0	0.0	0.0	0.0	0.0	27.6	17.2	27.6	17.2
NSR Growth Allowance	0	0	0	0	0	0	30	30	50	50
<b>Totals (tons per year):</b>	<b>122.9</b>	<b>335.0</b>	<b>82.8</b>	<b>240.1</b>	<b>87.2</b>	<b>251.3</b>	<b>151.1</b>	<b>310.8</b>	<b>172.8</b>	<b>333.8</b>
<b>Total (tons per average annual day):</b>	<b>0.34</b>	<b>0.92</b>	<b>0.23</b>	<b>0.66</b>	<b>0.24</b>	<b>0.69</b>	<b>0.41</b>	<b>0.85</b>	<b>0.47</b>	<b>0.91</b>

Operation	Growth Code	1990	2002	2005	2007
Aerospace	SIC_372&6-out	22.8	10.57	11.09	10.82
		2.16	1.00	1.05	1.02
Batch Plant	SIC_14-out	0.227	0.251	0.257	0.265
		0.90	1.00	1.02	1.06
Fiberglass	SIC_308-out	3.229	4.017	4.569	4.878
		0.804	1.00	1.137	1.214
Institution	SIC_806-I20	6.827	8.283	8.536	8.797
		0.824	1.00	1.031	1.062
Misc Coating/Manuf	DUR_MFG-out	74.21	82.72	94.16	101.3
		0.897	1.00	1.138	1.224
Wastewater/Landfill/Water	SIC_494+-out	0.501	0.547	0.578	0.602
		0.916	1.00	1.057	1.101
Misc Diesel Use	SIC_50&1-I31	30.81	41.52	45.79	47.35
		0.742	1.00	1.103	1.141

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## APPENDIX C - SOUTHEAST DESERT MODIFIED AQMA TRANSPORTATION CONFORMITY BUDGET

This budget is presented in units of tons per summer planning inventory day (or tons per ozone seasonal day)

ROG/VOC	<i>2005</i>	<i>2007</i>
Coachella Valley Portion	4.6	4.1
Antelope Valley Portion	6.3	5.6
Mojave Desert Portion	15.6	13.5
<b>Total SEDAQMA ROG/VOC Budget</b>	<b>26.5</b>	<b>23.2</b>
NO <sub>x</sub>	<i>2005</i>	<i>2007</i>
Coachella Valley Portion	12.3	11.1
Antelope Valley Portion	10.5	9.6
Mojave Desert Portion	45.5	42.5
<b>Total SEDAQMA NO<sub>x</sub> Budget</b>	<b>68.3</b>	<b>63.2</b>

Note that portions of the Southeast Desert Modified AQMA transportation conformity budget are presented for information only. The total for the AQMA is the budget.